

Service Manual

FM-AM Telephone Clock Radio

Radio
RC-T370
(Brown)



This is the Service Manual
for the following area.

M...For U.S.A.

■ SPECIFICATIONS

• Radio

Frequency Range:	FM; 88~108 MHz AM; 520~1610 kHz
Intermediate Frequency:	FM; 10.7 MHz AM; 455 kHz
Sensitivity:	FM; 18 μ V/50 mW (-3 dB Limit Sens) AM; 200 μ V/m/50 mW output
Power Requirement:	AC; 120V, 60 Hz (006P/6F22 (9V)... for clock battery back up)
Power Output:	450 mW... RMS (max.)
Power Consumption:	5 W at AC 120V
Speaker:	3" (8 cm) PM Dynamic Speaker (16 Ω)
Dimensions:	6 $\frac{5}{8}$ " (W) \times 3 $\frac{3}{4}$ " (H) \times 9 $\frac{7}{16}$ " (D) (168 \times 96 \times 240) mm
Weight:	3 lbs. 1 oz. (1.4 kg) without batteries

• Telephone

Power Requirement:	Telephone line voltage and UM4 \times 3 "AAA" size batteries (4.5 V)
Dialing System:	Tone (DTMF)/Pulse
Memory Capacity:	
Automatic Dialer;	30 telephone numbers up to 30 digits each
Redial;	Up to 30 digits
Pause	About 4 seconds by one press
Speaker:	
For Handset (earpiece);	1 $\frac{1}{2}$ " (4 cm) PM dynamic speaker
Microphone:	2 Electric condenser microphones (one for Speakerphone, the other for mouthpiece)
Ringer Equivalence:	1.0 B

Design and specifications are subject to change without notice.

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CONTENTS

ITEM	PAGE
SPECIFICATIONS	1
SAFETY PRECAUTIONS	2
INSULATION RESISTANCE TEST	2
LOCATION OF TELEPHONE CONTROLS AND COMPONENT	2
PREPARATION	4
CONNECTION TO A TELEPHONE LINE	5
LOCATION OF CLOCK RADIO AND COMPONENT	6
DISASSEMBLY INSTRUCTIONS	7
HOW TO FIX THE AC POWER CORD AND TELEPHONE LINE CORD	9
HOW TO USE 50 Hz TERRITORY	9
ELECTRICAL PARTS LIST	10
SCHEMATIC DIAGRAM (SPEAKERPHONE Section)	11
CIRCUIT BOARD DIAGRAM (SPEAKERPHONE Section)	12
IC BLOCK DIAGRAM	12
SCHEMATIC DIAGRAM (MAIN Section)	13
CIRCUIT BOARD DIAGRAM AND WIRING CONNECTION DIAGRAM (MAIN Section)	15
MEASUREMENTS AND ADJUSTMENTS	17
LED DISPLAY	19
UPD7507CU209 (IC3): EACH TERMINAL FUNCTION	20
RVILM8560B (IC101): EACH TERMINAL FUNCTION	21
BLOCK DIAGRAM	22
CABINET PARTS LOCATION	23

SAFETY PRECAUTIONS (For U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

INSULATION RESISTANCE TEST (For U.S.A.)

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads, antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3\text{M}\Omega$ and $5.2\text{M}\Omega$ to all exposed parts*. (Fig. 1) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. 2)

* **Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

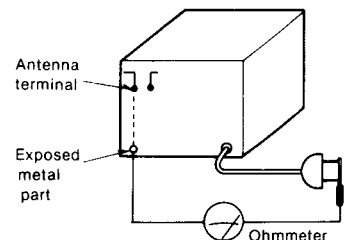


Fig. 1

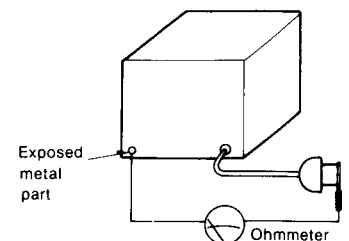
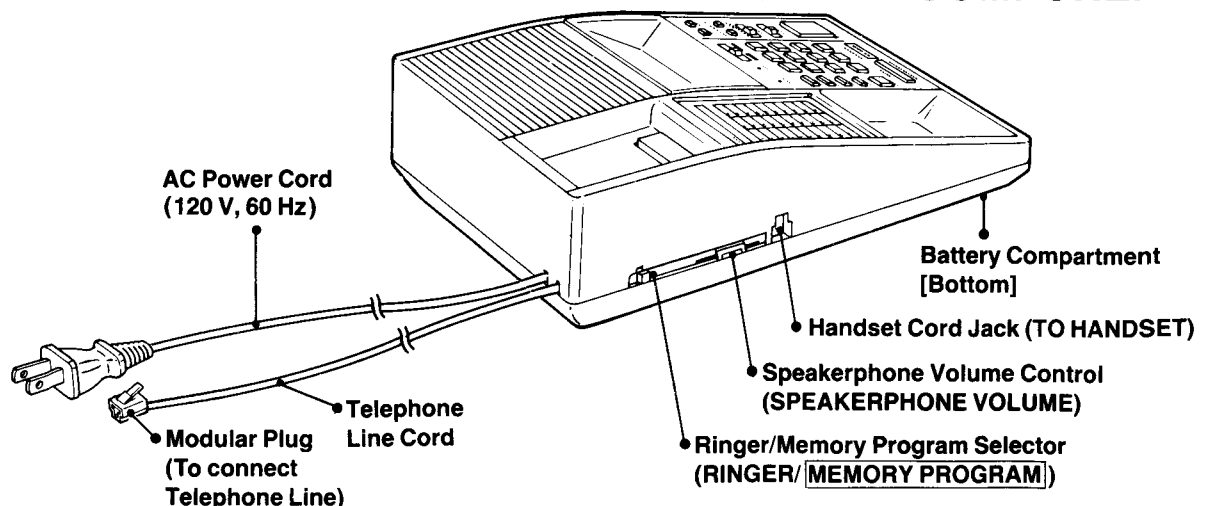
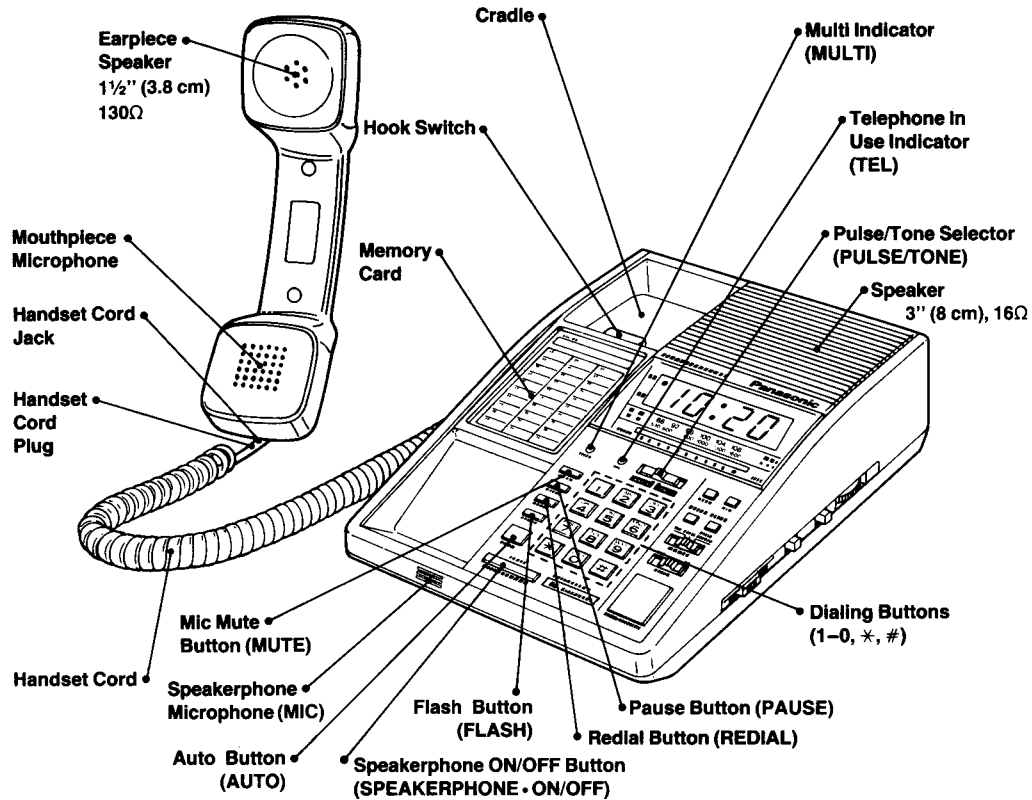
Resistance = $3\text{M}\Omega$ — $5.2\text{M}\Omega$ 

Fig. 2

Resistance = Approx ∞

LOCATION OF TELEPHONE CONTROL AND COMPONENT





Ringer/Memory Program Selector

HIGHThe ringer has a high sound.
LOWThe ringer has a low sound.
OFFThe ringer has no sound.

MEMORY PROGRAM

.....Set to this position when entering and programming telephone numbers into memory.

•After programming, be sure to reset to the desired ringer position.

Speakerphone Volume Control

Use this control to adjust the sound level from the speaker using as a speakerphone.

Pulse/Tone Selector

Select the type of dialing that your telephone system requires.

PULSE: Pulse dialing is the same as that normally associated with rotary dialing system.

TONE: Tone dial is much faster than pulse and it also provides the special tone signals required for independent, low-cost long distance and other special tone-dialing.

But it is not available in all locations and, therefore, you may find your telephone will not work with in "TONE" position.

Multi Indicator

This indicator lights, flashes, or goes out depending on the operation.

Mic Mute Button

When using your phone, if you press this button, you will shut off the Built-in Microphones. This function is useful if you would like the party you are speaking with not to hear conversation in your location.

To operate the Built-in Microphones, press the button again.

•Multi Indicator will flash when the Mic Mute Button functions.

Note:

Do not press the Mic Mute Button accidentally.

Pause Button

The Pause Button is used when an interruption is needed in the dialing sequence.

•Pressing the Pause Button once will provide about 4 seconds pause in the dialing sequence. (If you need 8 seconds, press twice.)

•This button is available for manual dialing, redialing and automatic dialing.

Redial Button

Press this button to redial the last phone number you dialed.

Flash Button and Hook Switch

•Press this button (or switch) for 2 seconds to obtain a new dial tone when the line is already seized.

•Press this button (or switch) to use call waiting feature.

Auto Button

This button is used to establish auto dialing mode, or to store numbers in memory when Ringer/Memory Program Selector is in the memory program position.

Speakerphone Microphone

Use for speaking with hand-free operation.

Speakerphone ON/OFF Button

Press this button to turn telephone on or off for hand-free operation.

•The Telephone In Use Indicator will light during hand-free operation.

PREPARATION

1. ASSEMBLY:

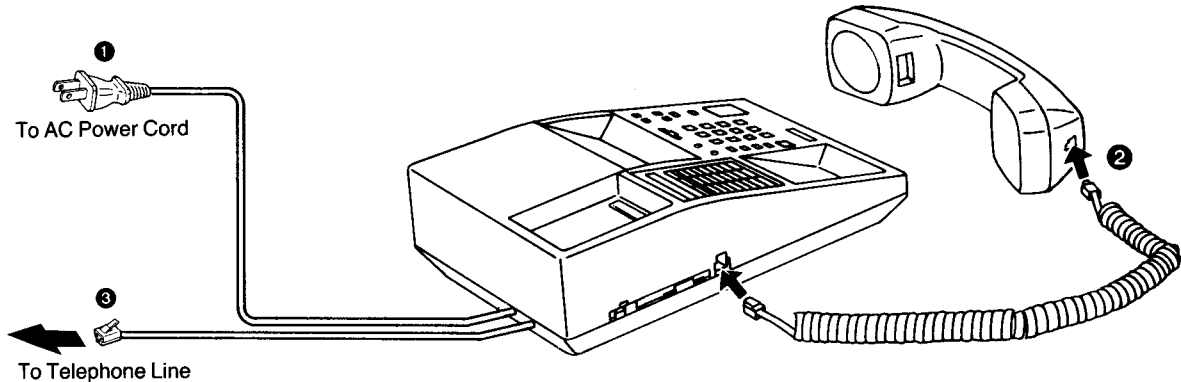
- ① Connect the AC power cord to an AC power outlet (AC 120 V, 60 Hz)
- ② Attach the Handset Cord to the Handset, and the telephone base unit. (See the Figure.)
 - To extend, or replace the Handset Cord use only "Mini Jack (4-Pin)" type.
- ③ Attach the Modular Plug to the telephone jack.

2. SETTING THE RINGER

- Adjust the Ringer/Memory Program Selector to your desired level, LOW or HIGH.

Note:

If you do not want the telephone to ring, switch the Ringer/Memory Program Selector to the "OFF" position. Always reset the selector to either the "HIGH" or "LOW" position when you wish to hear the phone ring again.



Memory Back-up Battery ☐

Three "AAA" size batteries (included) are needed as memory back-up for entering telephone number into memory.

Installation

1. Open the Battery Compartment cover.
2. Insert three "AAA" size batteries (included) observing correct polarity as shown in the Figure.

Removal

Press down the ⊖ side of the battery 3 and then press down the ⊕ side of the battery 1 for easy removal.

Battery life

Replace all the batteries after one year use.

Notes:

- When setting the Ringer/Memory Program Selector to "MEMORY PROGRAM", the batteries are used. So, be sure to set it to desired ringer position after programming.
- The basic telephone functions work without batteries, but memory function and the Flash Button function will not work.
- Battery life will be shortened when using the telephone with the Handset and extension phone together. And it will be greatly reduce when using the Speakerphone in the same way.

Sure Time Back-up Battery ☐

One 9-Volt battery (Panasonic 006P or equivalent) act as sure time back-up during power interruption.

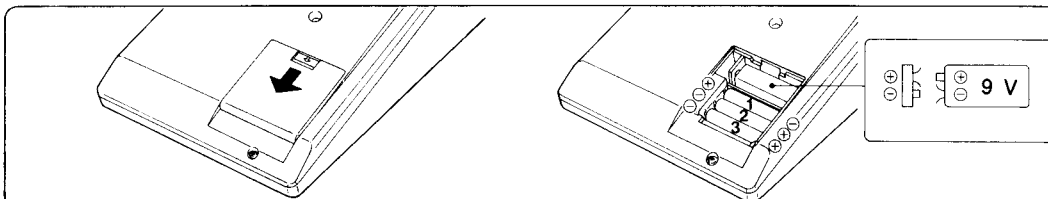
Installation

1. Connect a 9-Volt battery (Panasonic 006P or equivalent) to the snaps, observing correct polarity as shown in the Figure.
2. Close the Battery Compartment cover.

When replacing the battery

- Unplug the AC power cord from the AC outlet. After several seconds, plug it back into the outlet. If the digits flash continuously, replace the battery with a new one.
- Replace the battery with a new one after one year of use (most batteries have a shelf life of approximately one year).
- If an extended power failure or interruption occurs, replace the battery with a new one.

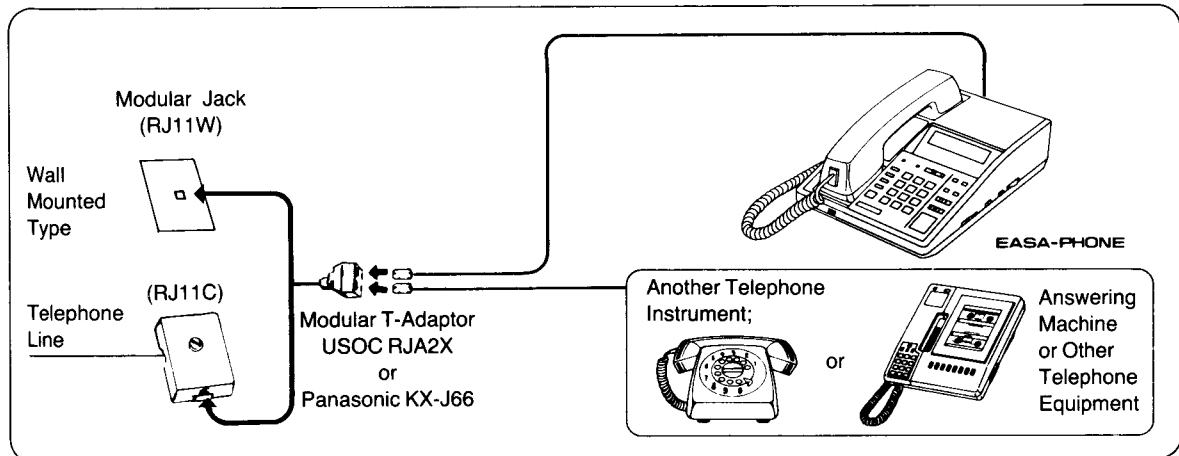
- Make sure that the Battery Compartment cover is closed completely. Otherwise the unit will not operate.
- Batteries installed with incorrect polarities may leak and damage this unit.



CONNECTION TO A TELEPHONE LINE

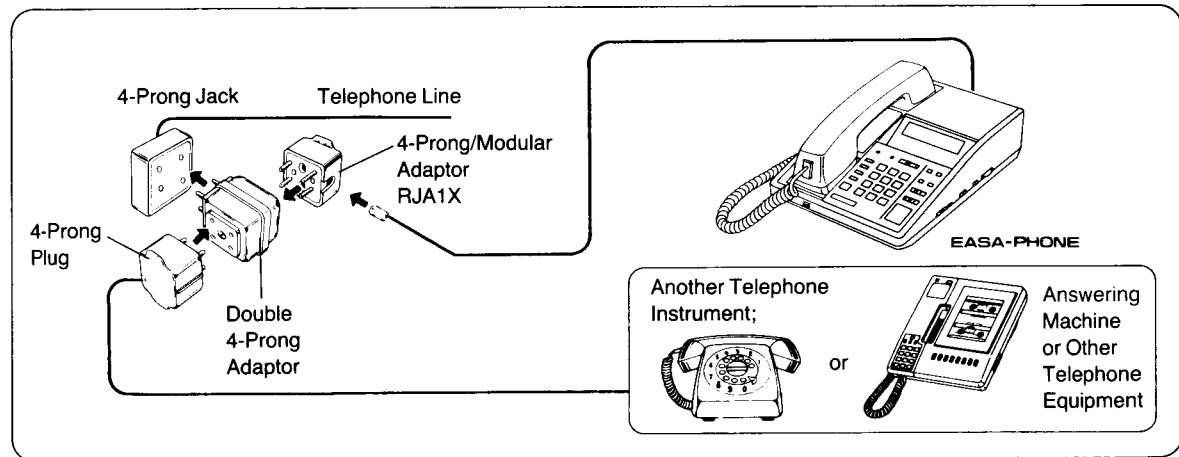
Modular Hook Up

- If a modular jack is available, plug the telephone line cord into the jack.
- By using a T adaptor, you can share an existing modular jack.



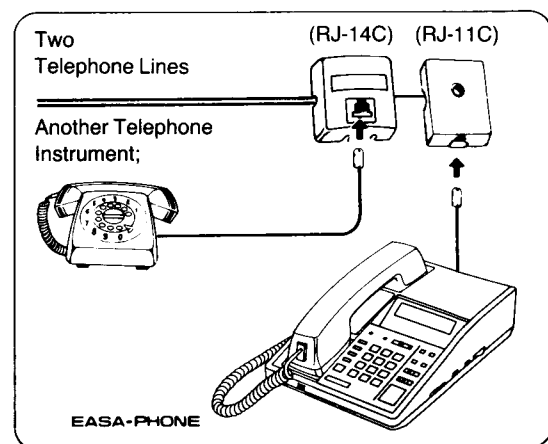
4-Prong Hook Up

- To use an existing 4-prong jack, you will need an adaptor (USOC RJA1X).

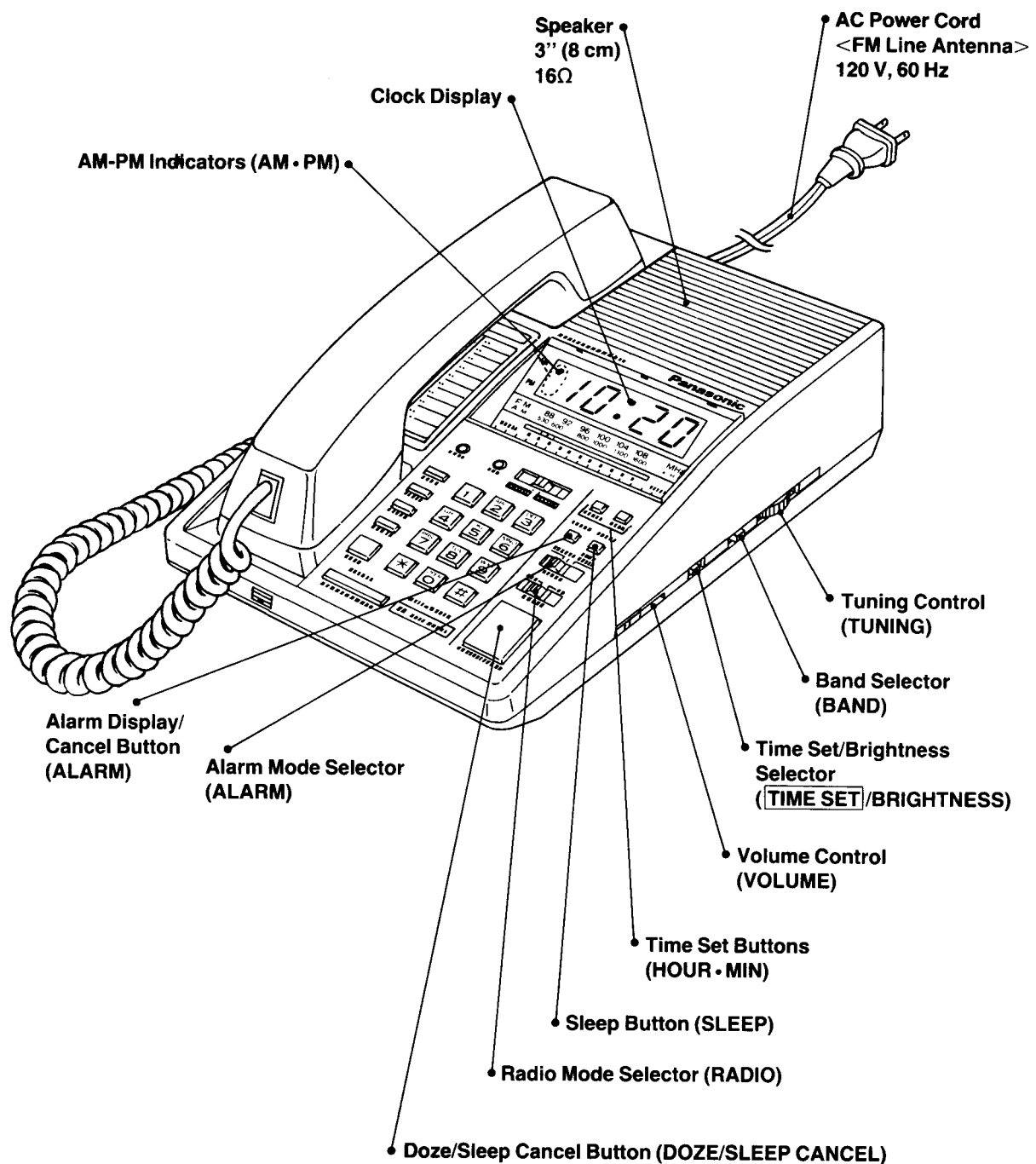


Dual Telephone Jack

- If you have two separate telephone lines (USOC RJ14C), have the telephone company make a USOC RJ11C connection to the line you wish to use.



LOCATION OF CLOCK RADIO CONTROL AND COMPONENT



Automatic Radio Mute

Your telephone automatically mutes the radio when the telephone rings, you press the speaker, ON/OFF Button or you lift the Handset.

•When the telephone call is over or you return the Hand set after your call the radio functions again.

Note:

During programming, the radio will be muted.

DISASSEMBLY INSTRUCTIONS

(Main Unit)

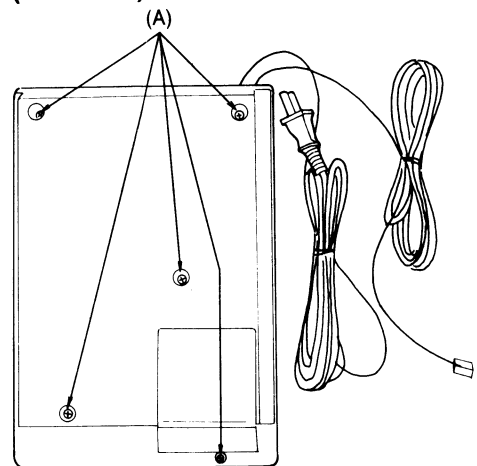


Fig. 1

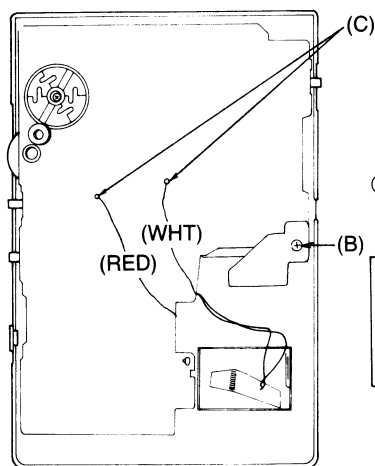


Fig. 2

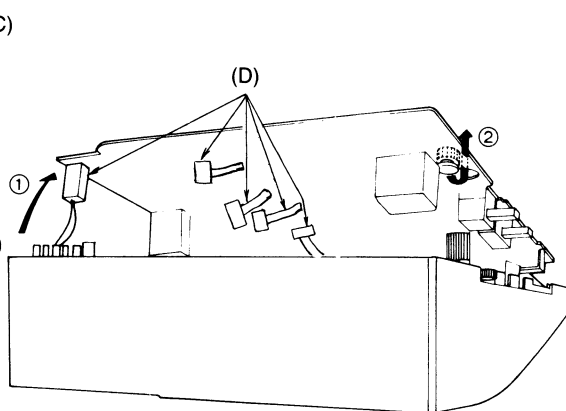


Fig. 3

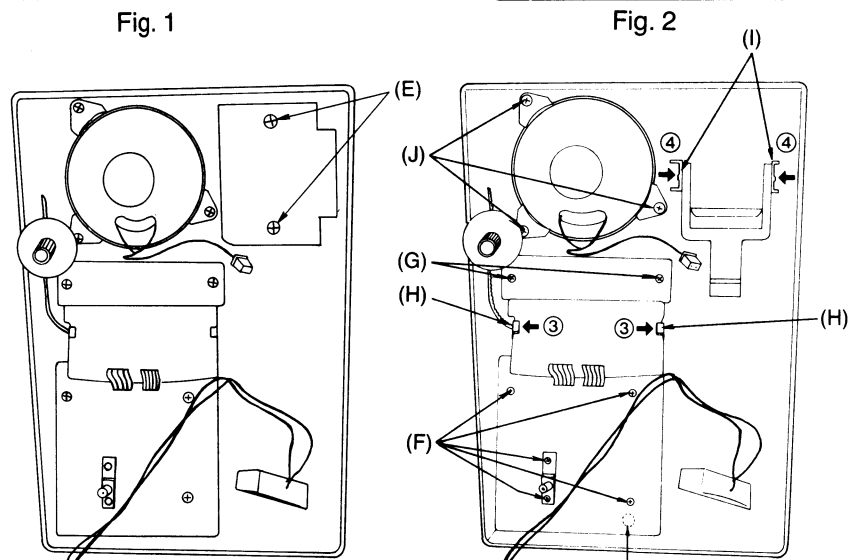
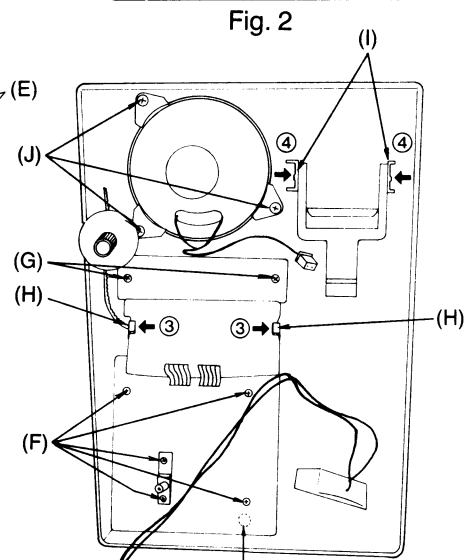


Fig. 4

*1 Spring
Fig. 5

(Hand Set)

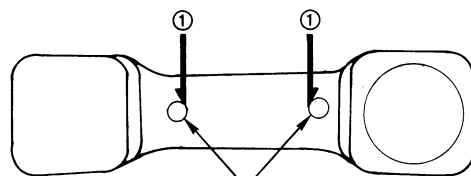


Fig. 1

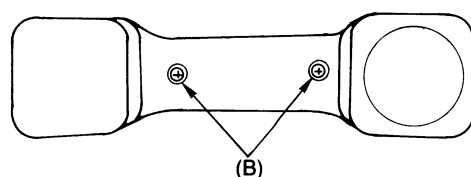


Fig. 2

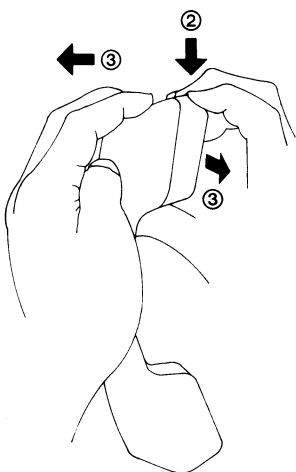


Fig. 3

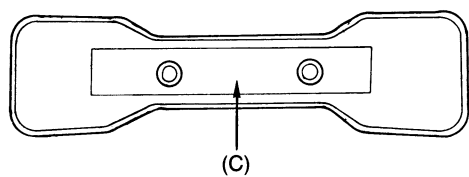


Fig. 4

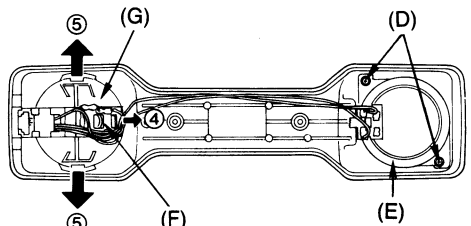


Fig. 5

■ Main Unit

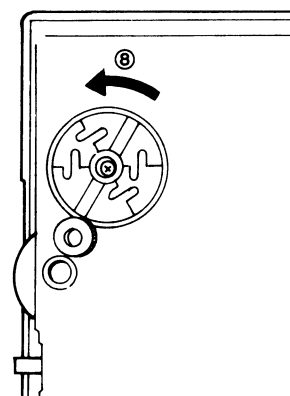
Ref. No.	Shown in Fig.—	To remove—	Remove—
1	1	Bottom Cabinet	Screw (3×12) mm (A)×5
2	2	Main Circuit Board	Screw (3×12) mm (B)×1
3	2		Unsolder the 2 lead wires (C)×2
4	3		Pull the main circuit board in the direction of arrow ①.
5	3		Plug (CP4) (CP301) (CP302) (CP303) (CP5) (D)×5
6	3	Relay Gear	Pull out the relay gear in the direction of arrow ②.
7	4	Speakerphone Circuit Board	Screw (3×12) mm (E)×2
8	5	Circuit Boards (Keyboard Clock Display)	Screw (2×6) mm (F)×5
9	5		Screw (2×6) mm (G)×2
10	5		Push the rib in the direction of the arrows ③. (H)×2
11	5	Hook Button	Push the boss in the direction of the arrow ④. (I)×2
12	5	Speaker	Screw (3×8) mm (J)×3

*1 When removing the printed circuit board, be careful not to lose the spring located underneath it.

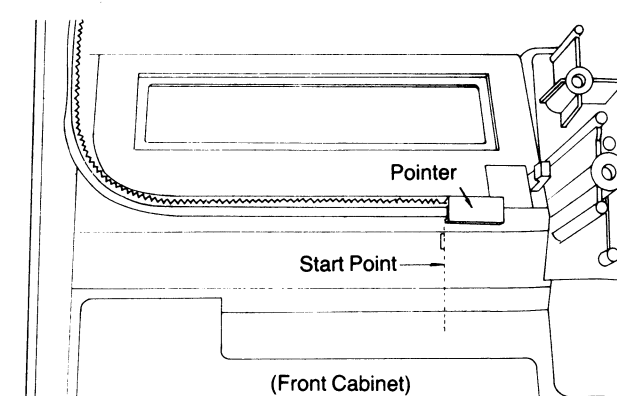
■ Hand Set

Ref. No.	Shown in Fig.—	To remove—	Remove—
1	1	Rubber	Push the rubber end in the direction of arrow ① with a straight slot screwdriver and lift up (A)×2
2	2	Upper Cabinet	Screw (2.6×10) mm (B)×2
3	3		Push the cabinet in the direction of arrow ② and remove in the direction of arrows ③.
4	4	Weight (*1)	Pull off the weight from the top cabinet (C)×1
5	5	Earpiece Speaker	Screw (2.6×10) mm (D)×2
6	5		Holder (E)×1
7	5	Mouthpiece Microphone	Push the rib in the direction of the arrows ④ and pull out the microphone (F)×1
8	5		Push the ribs in the direction of the arrows ⑤ and pull out the microphone holder (G)×1

■ DIAL SETTING POINT



Position the Pointer at the start point and turn the dial drum as far as it will go in the direction of the arrow ⑧. Then assemble.



(Front Cabinet)

HOW TO FIX THE AC POWER CORD AND TELEPHONE LINE CORD

Note:

Route the AC power cord and the telephone line cord as shown in Fig. 1.

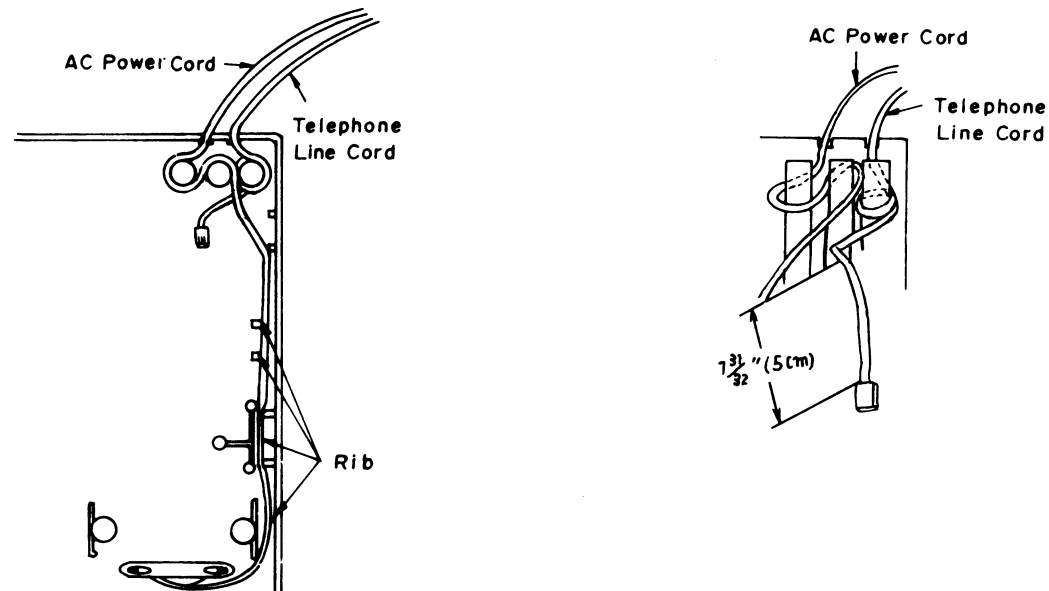
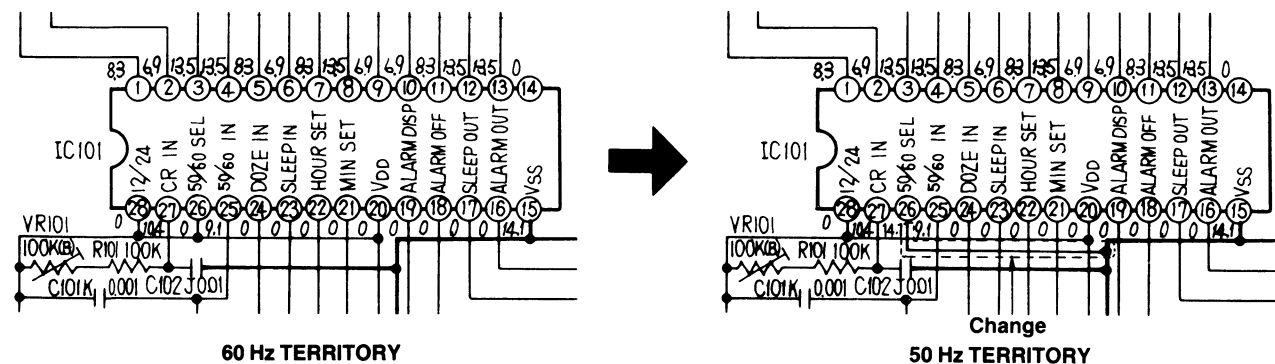


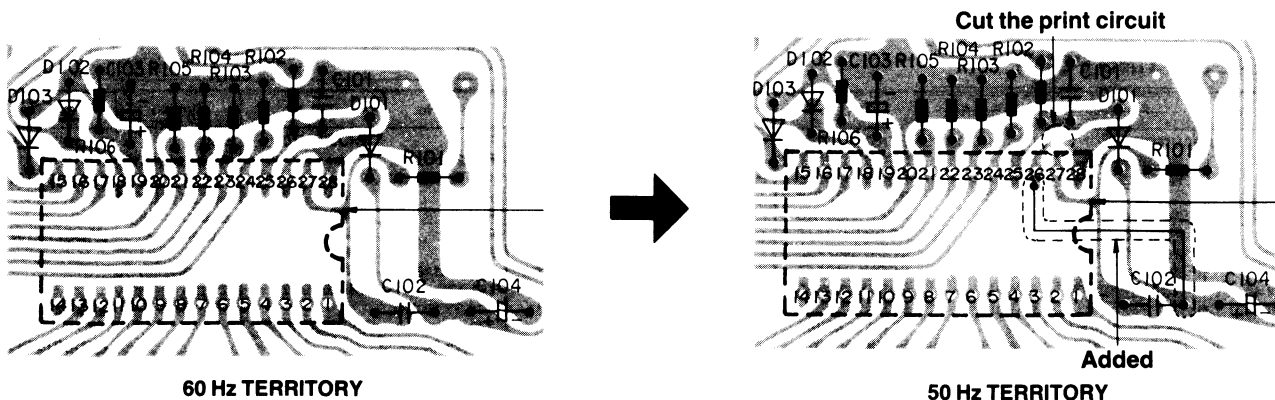
Fig. 1

HOW TO USE 50 Hz TERRITORY

■ SCHEMATIC DIAGRAM



■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



ELECTRICAL PARTS LIST

Numbering System of Resistor

Example	25	F	J	101
ERD	Wattage	Shape	Tolerance	Value (100Ω)
ERX	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value (2.2Ω)

Resistor Type	Wattage	Tolerance
ERD: Carbon	10 : 1/8 W	J : ±5%
ERD: Metal Film	12 : 1/2 W	
ERX: Metal Film	25 : 1/4 W	
ERQ: Fuse Type Metal	1 : 1 W	
RRD: Carbon (Chip Type)	18 : 1/8 W	

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Numbering System of Capacitor

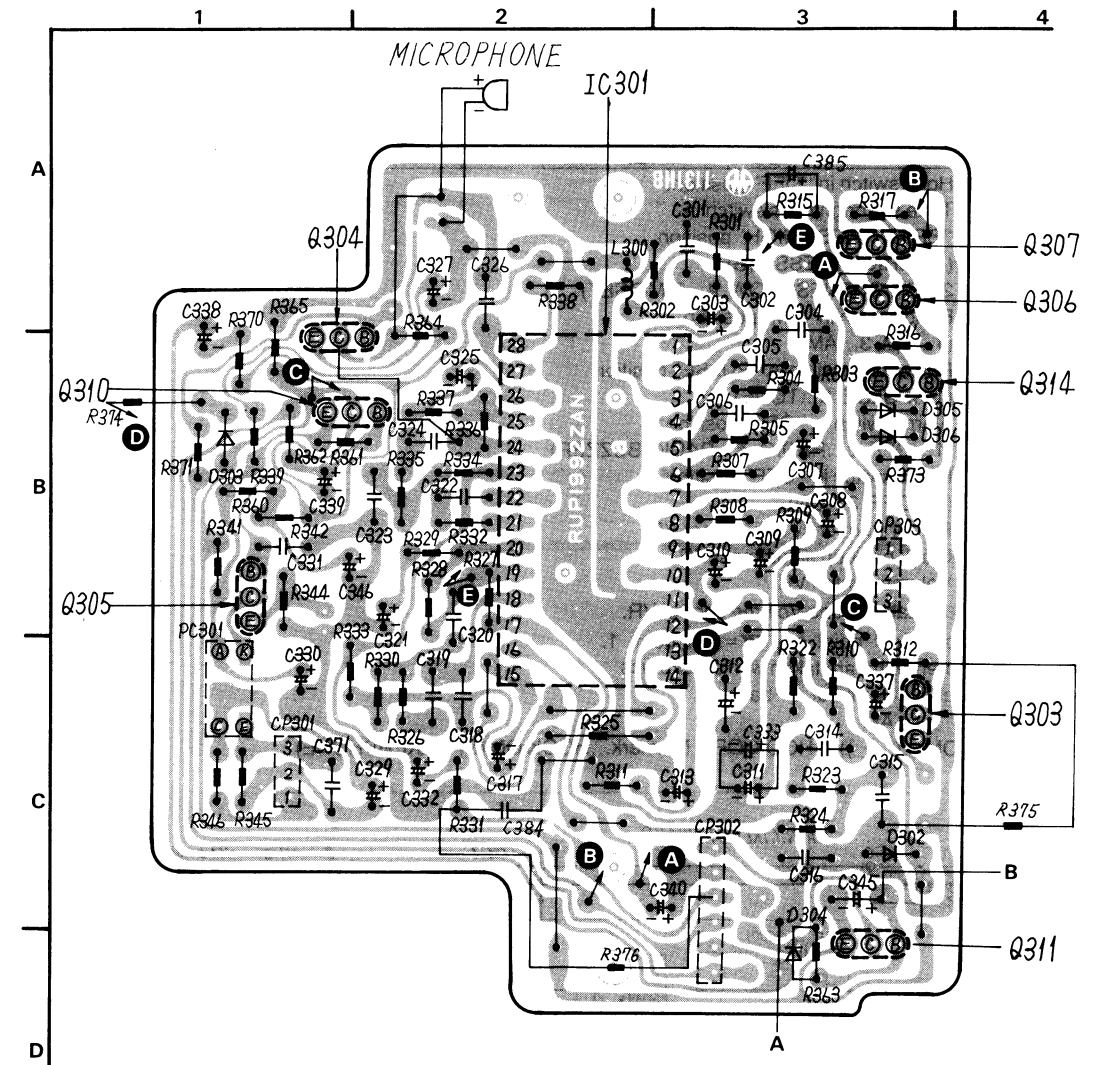
Example	1H	102	Z	F
ECKD	Voltage	Value (1000 pF)	Tolerance	Peculiarity
ECEA	50	M	R47	
Type	Voltage	Peculiarity	Value (0.47 μF)	

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA: Electrolytic	OJ : 6.3 V	2H : 500 V DC	C : ±0.25 pF
ECCD: Ceramic	1A : 10 V	1 : 100 V	J : ±5%
ECKD: Ceramic	1C : 16 V	DKC : 400 V AC	K : ±10%
ECQM: Polyester	1E : 25 V		Z : +80%, -20%
ECQP: Polypropylene	1H : 50 V		P : +100%, -0%
	1V : 35 V		
	50 : 50 V		
ECET: Electrolytic	25 : 25 V		
ECEA□□□N: Non Polar Electrolytic	16 : 16 V		
QCU □: Ceramic (Chip Type)			
ECUX: Ceramic (Chip Type)			

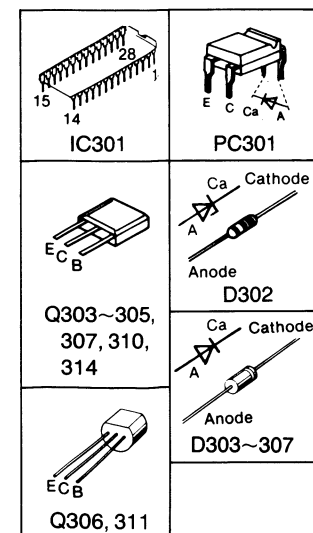
Ref. No.	Part. No.	Ref. No.	Part. No.	Ref. No.	Part. No.	Ref. No.	Part. No.	Ref. No.	Part. No.
RESISTORS					CAPACITORS				
R1,2,21	ERDS2TJ6R8	R24,112,113	ERDS2TJ330	R325	ERD25TJ225	C11,136,326	ECFT1C473MD	C115	RCBS1H4R7KC
R3,28,304	ERDS2TJ154	R26,30,40,41,42,		R326	ERDS2TJ183	C14	ECEA1HUR22	C116	RCBS1H120JC
R4,10,33,61,86,		43,73,106,125,		R327	ERDS2TJ391	C17	ECEA0JU470	C117,119	RCBS1H180JC
301,302,308,338,	ERDS2TJ105	138,144,309	ERDS2TJ474	R328,331	ERDS2TJ223	C18,42,104,141,		C122	RCBS1H470JL
411,419		R27,35,48,49,50,		R329	ERDS2TJ122	405	ECEA1HU100	C130,406	RCBS1H6R8KC
R5,141	ERDS2TJ152	51,85,87,342,		R334,335,363	ERDS2TJ123	C19	ECQV1H224JZ	C132	ECEA1EU101
R6,8,9,57,59,62,		423,435	ERDS2TJ224	R336,362,375	ERDS2TJ563	C20,102	ECQB1H103JZ	C139	ECEA1EU330
64,80,115,124,		R31,60,72,77,88,		R345	ERDS2TJ331	C21,140,414	ECEA1HU010	C143	ECKD1H472MD
127,360,374,376,		90,101,102,103,		R401	ERD25FJ392	C22	ECSE1CE225	C149	ECEA1HU407
414,416,430,454,		104,105,107,128,		R404	ERD25FJ104	C23	RCBS1H330JL	C155	ECEA1HU407
455,459	ERDS2TJ103	312,317,332,365,		R417	ERD25FJ682	C24,129	RCBS1H100JC	C301,302,324	ECQV1H104JZ
R7,75	ERD25TJ475	371,403,409,413,		R418,432	ERD25FJ472	C25,113,114,135,		C303,308,310	ECEA1HK2R2
R11	ERG1ANJP682S	421,422,425,427,		R424	ERD25TJ223	150	ECKD1H102MD	C307	ECEA1HK3R3
R12	ERDS2TJ100	451,458,460,461	ERDS2TJ104	R426	ERD25FJ562	C27	ECQB1H332JZ	C309,339	ECEA1HKR47
R13,20,53,110,				R428	ERD25FJ222	C28	ECQB1H822JZ	C311	ECEA0GK221
111,123,130,134,				R429	ERD25TJ474	C29,134	RCBS1H471KB	C312	ECEA0JU102
139,322,337,364,				R435,453	ERDS2TJ682	C32	ECQB1H123JZ	C313,325	ECEA1HK010
410	ERDS2TJ222			R450	ERD25TJ564	C33,47	ECQB1H472JZ	C315,316,331	ECFT1C104MD
R14,68,303,305,						C40,45,306,319,		C317	ECEA0JK470
330,415,433	ERD25TJ153					413	ECFT1C333MD	C318,322	RCBS1C472MX
R15,36	ERDS2TJ560					C44	ECEA1CN330S	C321	ECEA1HKR33
R16,58,67,70,71,						C46,128,133,148	ECEA1AU101	C327	ECEA0JK221
129,131,136,137,						C50	ECQP2E102JZ	C329,337,340	ECEA1CK100
373	ERDS2TJ473					C51	ECQV1H104JZ	C330,346	ECEA0JK101
R17	ERDS2TJ823					C52,120,146	ECKD1H103MD	C332	ECFT1E882MD
R18,118,119,121,						C103,144,151,		C338	ECEA1HK0R1
135,346,457	ERDS2TJ221					407	ECEA1EU3R3	C345	ECEA0JN101
R19,23,29,120,						C106	ECEA1EU102	C371	ECQV1H474JZ
142,344	ERDS2TJ101					C107,109,110,		C383	ECQV1H474JZ
R22,25,34,55,56,						111	ECKD1H103ZF	C384	ECQP2A103JZ
65,66,78,132,133,						C108	ECKD1H333ZF	C385	ECEA1HK477
420	ERDS2TJ333					C112	ECCD1H220KC	C401	ECEA1HU2R2

Ref. No.	Part. No.	Part Name & Description	Ref. No.	Part. No.	Part Name & Description	Ref. No.	Part. No.	Part Name & Description
INTEGRATED CIRCUITS			DIODES & RECTIFIERS			TRANSFORMERS		
IC1	BA6564	Integrated Circuit	D1,8,9,13,14,19,101,102,			T1	RLT2F43A	Lower Frequency Transformer
IC2	SRM2114CL9	Integrated Circuit	110,402,404,405,406,407,			T101	RLT57C9A	Power Transformer Δ
IC3	UPD7507CU209	Integrated Circuit	409,410	MA165	Diode (Si)	T102,104,105		
IC4	RVIUPD4069BC	Integrated Circuit	D2,10	RVDS1YB4001	Diode (Si)		RLI4B153	IFT, FM 1st/2nd/3rd
IC101	RVILM8560B	Integrated Circuit	D3	MA2200	Diode (Si)	T103	RLI2B251	IFT, AM 1st
IC102	RVITA7358P	Integrated Circuit	D4,113	MA4056M	Diode (Si)	T106	RLI2B454	IFT, AM 2nd
IC103	RVITA7613AP	Integrated Circuit	D5	ERZC10DK241	Diode (Si)			
IC301	BA6571	Integrated Circuit	D7	ERZC07DK241	Diode (Si)			
TRANSISTORS			D11	MA2300	Diode (Si)			
Q1	2SA1156L	Transistor (Ge)	D15,16	RVDP2434D	LED (Multi, TEL)			
Q2	2SC2551Y	Transistor (Si)	D17,28,103	MA700	Diode (Si)			
Q5,8,9,10,15,16,17,19,21,			D23,26,112	RVDMT28R2B	Diode (Si)			
103,104,405,408,415,416,								
417	2SC3311Q	Transistor (Si)	D24,25	MA4043M	Diode (Si)			
Q6,414	2SC945-Q	Transistor (Si)	D105,106,107,108,109	RVDS1SR35	Diode (Si)			
Q7,11,105	2SC2001L	Transistor (Si)	D302	MA2056B	Diode (Si)			
Q12,101,409,412			D303,304,305,306					
	2SA1309Q	Transistor (Ge)						
Q18	2SK184GR	FET (Si)						
Q303,305	2SC3311Q	Transistor (Si)						
Q304,307	2SC3311R	Transistor (Si)						
Q306,311	2SC2001K	Transistor (Si)						
Q310	2SA1309Q	Transistor (Ge)						
Q314	2SA1309S	Transistor (Ge)						
Q401	2SA952L1	Transistor (Si)						
Q402,404	2SC3311S	Transistor (Si)						
Q403	2SB977Q	Transistor (Si)						
Q411,413	2SC2001K	Transistor (Si)						
PHOTO COUPLERS								
PC1,401	ON3111Q	Photo Coupler						
PC301	ON3111Q	Photo Coupler						

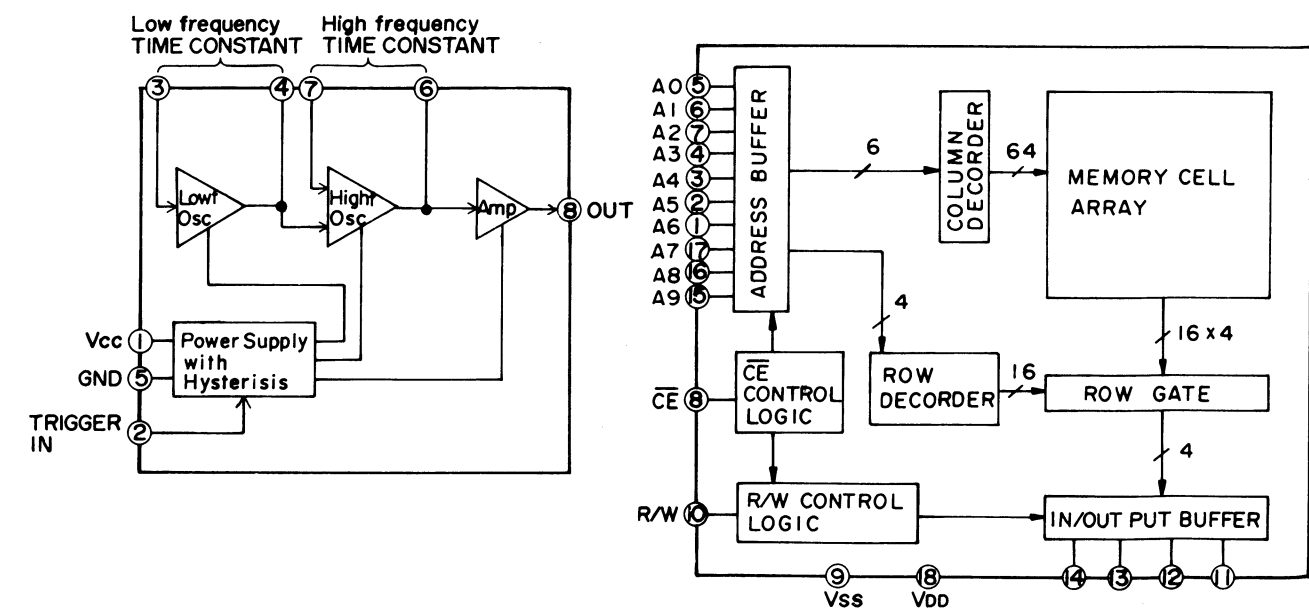
CIRCUIT BOARD DIAGRAM (SPEAKEPRHONE Section)



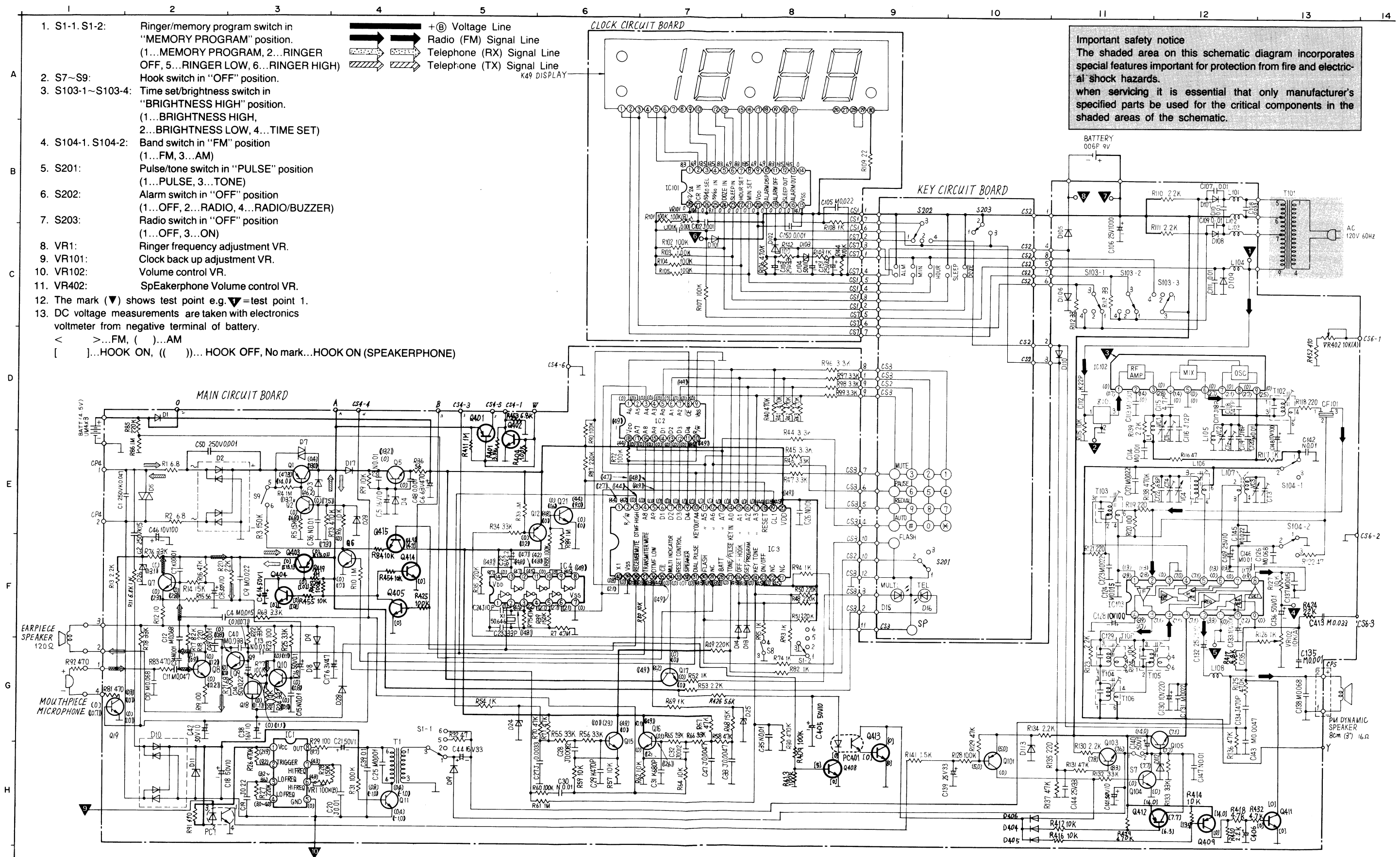
	Destination	Signal Name
1	CS6-1	Speakerphone Switching
2	CS6-2	Backup +B
3	CS6-3	Mic Gain Control



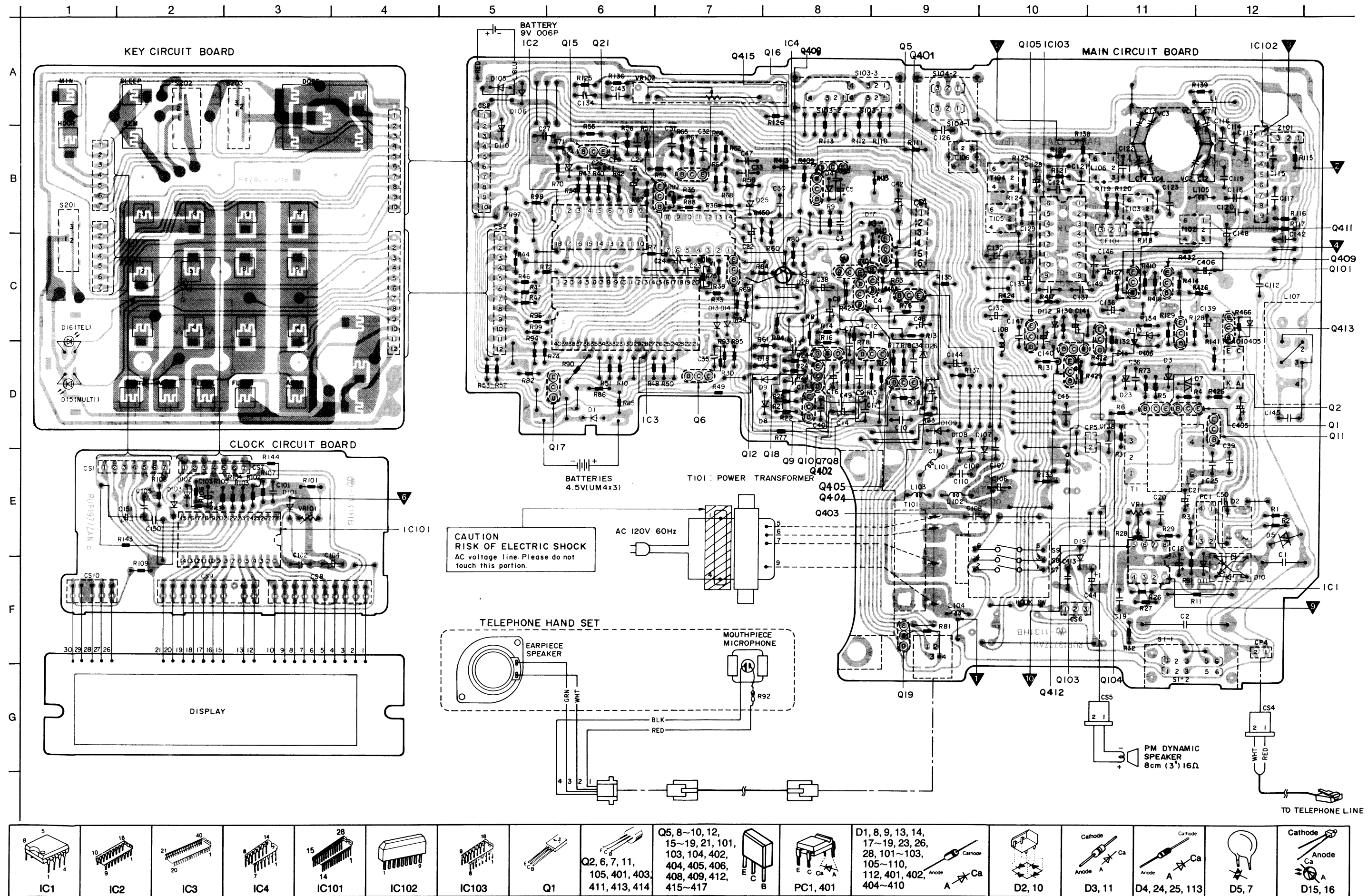
IC2: SRM2114CL9



SCHEMATIC DIAGRAM (MAIN Section)



CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (MAIN Section)



MEASUREMENTS AND ADJUSTMENTS

ALIGNMENT INSTRUCTION

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT	
1. Set volume control to maximum.	4. Set power source voltage to 120 V AC.
2. Set band switch to AM or FM.	5. Output of signal generator should be no higher than necessary to obtain an output reading.
3. Set radio switch to on.	

AM ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS	
	CONNECTIONS	FREQUENCY					
AM-IF ALIGNMENT							
(1)	AM	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. at 400 Hz	Point of non-interference. (on/ about 600 kHz)	Output meter across voice coil.	T103 (AM 1st IFT) T106 (AM 2nd IFT)	Adjust for maximum output.
AM-RF ALIGNMENT							
(2)	AM	"	511 kHz	Tuning capacitor fully closed.	"	L106 (AM OSC Coil)	Adjust for maximum output.
(3)	AM	"	1650 kHz	Tuning capacitor fully open.	"	CT4 (AM OSC Trimmer)	"
(4)	AM	"	550 kHz	Tune to signal.	"	(* 1) L107 (AM ANT Coil)	Adjust for maximum output. Adjust L107 by moving coil bobbin along ferrite core.
(5)	AM	"	1500 kHz	"	"	CT3 (AM ANT Trimmer)	Adjust for maximum output. Repeat steps (2)~(5).
(* 1) Cement antenna bobbin with wax after completing alignment.							

FM ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
FM-IF ALIGNMENT						
(1)	FM	High side thru. 0.001 μ F to test point ∇ , Negative side to test point ∇ .	10.7 MHz (400 Hz SWP.)	Point of non-interference. (on/ about 90 MHz)	Connect vert. amp. of scope to test point ∇ . Negative side to test point ∇ .	T102 (FM 1st IFT) T104 (FM 2nd IFT) Adjust for maximum amplitude. (Refer to fig. 2).
(2)	FM	"	"	"	"	T105 (FM 3rd IFT) Adjust for maximum amplitude. (Refer to fig. 3).
FM-RF ALIGNMENT						
(3)	FM	Connect to test point ∇ through FM dummy antenna. Negative side to test point ∇ .	86.2 MHz	Variable capacitor fully closed.	Output meter across voice coil.	L105 (FM OSC Coil) (* 2) Adjust for maximum output.
(4)	FM		109.2 MHz	Variable capacitor fully open.	"	CT2 (FM OSC Trimmer) "
(5)	FM		106 MHz	Tune to signal.	"	CT1 (FM ANT Trimmer) (* 2) Adjust for maximum output. Repeat steps (3)~(5).
(*2) Three output responses will be present; proper tuning is the center frequency.						

BATTERY BACK-UP CIRCUIT ALIGNMENT

Notes: 1. Disconnect AC power cord. 2. Remove the battery					
DC POWER SUPPLY		FREQUENCY COUNTER	ADJUSTMENT	REMARKS	
CONNECTIONS	VOLTAGE				
(+) Side... ∇	9 Volts	(+) Side... ∇	VR101 (Semi-fixed)	Adjust VR101 for 900 \pm 15 Hz on frequency counter reading. (Refer to Fig. 5) (*3, 4, 5)	
(-) Side... ∇		(-) Side... ∇			

TELEPHONE RINGER FREQUENCY ADJUSTMENT

Notes:

1. Disconnect AC power cord
2. Remove the battery

DC POWER SUPPLY		FREQUENCY COUNTER	ADJUSTMENT	REMARKS
CONNECTIONS	VOLTAGE			
(+) Side... ∇ (-) Side... ∇	24 Volts	SP OUT	VR1	<ul style="list-style-type: none"> Short the IC1 ③ pin and IC1 ⑤ pin Hook switch to ON Adjust VR1 for 500 \pm 15 Hz on frequency counter reading (Refer to Fig. 4)

ALIGNMENT POINT

* See the circuit diagram and P.C. board connection diagram for the location of the test points.

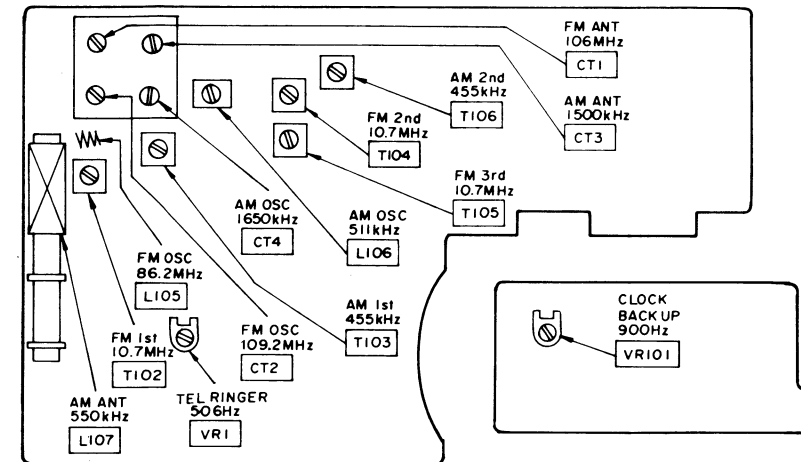


Fig. 1

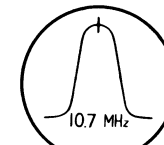


Fig. 2



Fig. 3

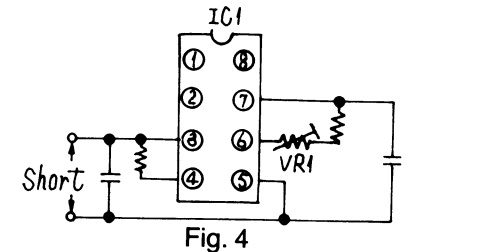


Fig. 4

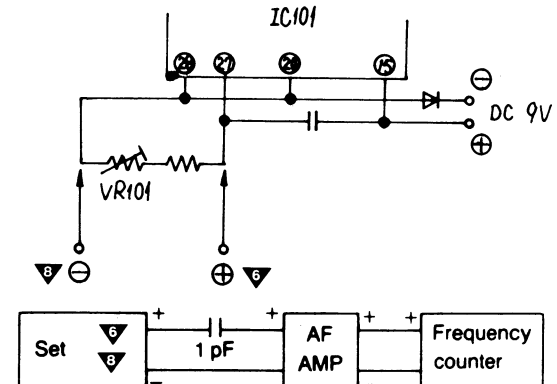


Fig. 5

- *3. Connect 1 pF capacitor to the test point ∇ .
- *4. Amplify its output signal by using the AF Amp.
- *5. Measure the frequency.

ZONE CHART: [This chart is described to each semiconductors location (Zone), Part No. and Function Name in the schematic diagram (MAIN circuit and Clock circuit) on page 13 and 14.)]

Ref. No.	Zone	Part No.	Function Name	Ref. No.	Zone	Part No.	Function Name
IC1	H-3	BA6564	TONE/RINGER	Q415	F-4	2SC3311Q	SWITCHING
IC2	D-7	SRM2114CL9	MEMORY	PC1	H-2	ON3111Q	SWITCHING
IC3	F-7	UPD7507CU209	DIALER	PC401	G-9	ON3111Q	SWITCHING
IC4	F-6	RV1UPD4069BC	INVERTER/OSC	D1	D-2	MA165	SWITCHING
IC101	B-7	RV1LM8560B	CLOCK LSI	D2	E-2	RVDS1YB4001	RECTIFIER
IC102	D-12	RV1TA7358P	FM FRONT END	D3	E-3	MA2200	STABI
IC103	F-12	RV1TA7613AP	FM/AM IF AMP. DET. AM OSC/MIX & POWER AMP	D4	E-4	MA4056M	REGULATOR
Q1	E-3	2SA1156L	REGULATOR	D5	E-2	ERZC10DK241	PROTECTOR
Q2	E-3	2SC2551Y	REGULATOR	D7	E-3	ERZC07DK241	PROTECTOR
Q5	E-4	2SC3311Q	REGULATOR	D8	G-3	MA165	STABI
Q6	F-4	2SC945P1 (2SC945-Q)	SWITCHING	D9	G-3	MA165	STABI
Q7	F-2	2SC2001L1	AF AMP	D10	H-2	RVDS1YB4001	RECTIFIER
Q8	G-2	2SC3311Q	H.P.F.	D11	H-2	MA2300	STABI
Q9	G-3	2SC3311Q	RECEIVER AMP	D13	F-8	MA165	AND GATE
Q10	G-3	2SC3311Q	RECEIVER AMP	D14	F-7	MA165	AND GATE
Q11	H-4	2SC2001L1	SWITCHING	D15	F-9	RVDP2434D	MULTI IND
Q12	E-6	2SA1309Q	SWITCHING	D16	F-9	RVDP2434D	TEL IND
Q15	G-6	2SC3311Q	DIFF AMP	D17	E-4	MA700	SWITCHING
Q16	G-7	2SC3311Q	DIFF AMP	D18	F-4	MA165	SWITCHING
Q17	G-7	2SC3311Q	SWITCHING	D19	H-5	MA165	SWITCHING
Q18	G-3	2SK184GR	SWITCHING	D23	E-4	RVDMT28R2B	STABI
Q19	G-1	2SC3311Q	SWITCHING	D24	G-5	MA4043M	STABI
Q21	E-6	2SC3311Q	SWITCHING (RESET)	D25	G-8	MA4043M	STABI
Q101	H-10	2SA1309Q	SWITCHING	D26	F-2	RVDMT28R2B	STABI
Q103	H-11	2SC3311Q	SWITCHING	D28	G-4	MA700	SWITCHING
Q104	H-11	2SC3311Q	SWITCHING	D101	C-7	MA165	RECTIFIER
Q105	G-12	2SC2001L1	REGULATOR	D102	C-8	MA165	SWITCHING
Q401	E-5	2SA952L1	SWITCHING	D103	C-8	MA165	SWITCHING
Q402	E-5	2SC3311S	SWITCHING	D105	C-11	RVDS1SR35	PROTECTOR
Q403	F-3	2SB977Q	SWITCHING	D106	C-11	RVDS1SR35	PROTECTOR
Q404	F-3	2SC3311S	SWITCHING	D107	B-12	RVDS1SR35	RECTIFIER
Q405	F-4	2SC3311Q	SWITCHING	D108	C-12	RVDS1SR35	RECTIFIER
Q408	H-8	2SC3311Q	SWITCHING	D109	C-12	RVDS1SR35	RECTIFIER
Q409	H-12	2SA1309Q	SWITCHING	D110	D-11	MA165	SWITCHING
Q411	H-13	2SC2001K	SWITCHING	D112	H-12	RVDMT28R2B	REGULATOR
Q412	H-12	2SA1309Q	SWITCHING	D113	H-10	MA4056M	STABI
Q413	G-9	2SC2001K	SWITCHING	D404	H-11	MA165	SWITCHING
Q414	F-4	2SC945K (2SC945Q)	SWITCHING	D405	H-11	HA165	SWITCHING
				D406	H-11	MA165	SWITCHING

()...Supply Parts Number

LED DISPLAY

1) LED display's internal wiring diagram

This LED display is composed of 28 light emitting diodes.

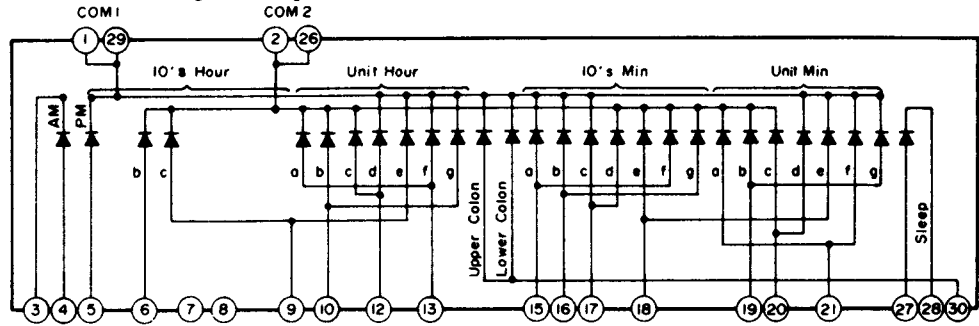


Fig. 1

2) Timing Chart

- a) A current flows through the circuit in a forward direction and light is emitted from the semiconductor junction. A potential difference of about 2 V is necessary.

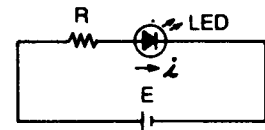


Fig. 2

- b) The timing chart below illustrates the requirements for turning on one segment (Light emitting diode). Common signal (COM 1 & 2) are always applied to the cathode. Segment signal is applied to the anode only when lighting a segment is required.

When the common signal is COM 1 and segment signal is "A", a potential difference of about 2 V is generated, and the light emitting diode lights.

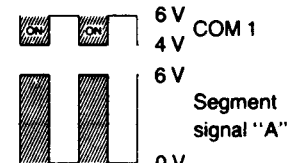


Fig. 3

If the common signal is COM 2 and segment signal is "A", there is no potential difference, thus no current flows and the light emitting diode does not light.

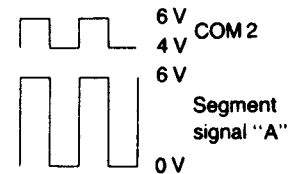


Fig. 4

- c) The timing chart example shows signals require to generate 2 on the MIN display. Each segment is lit in the same way.

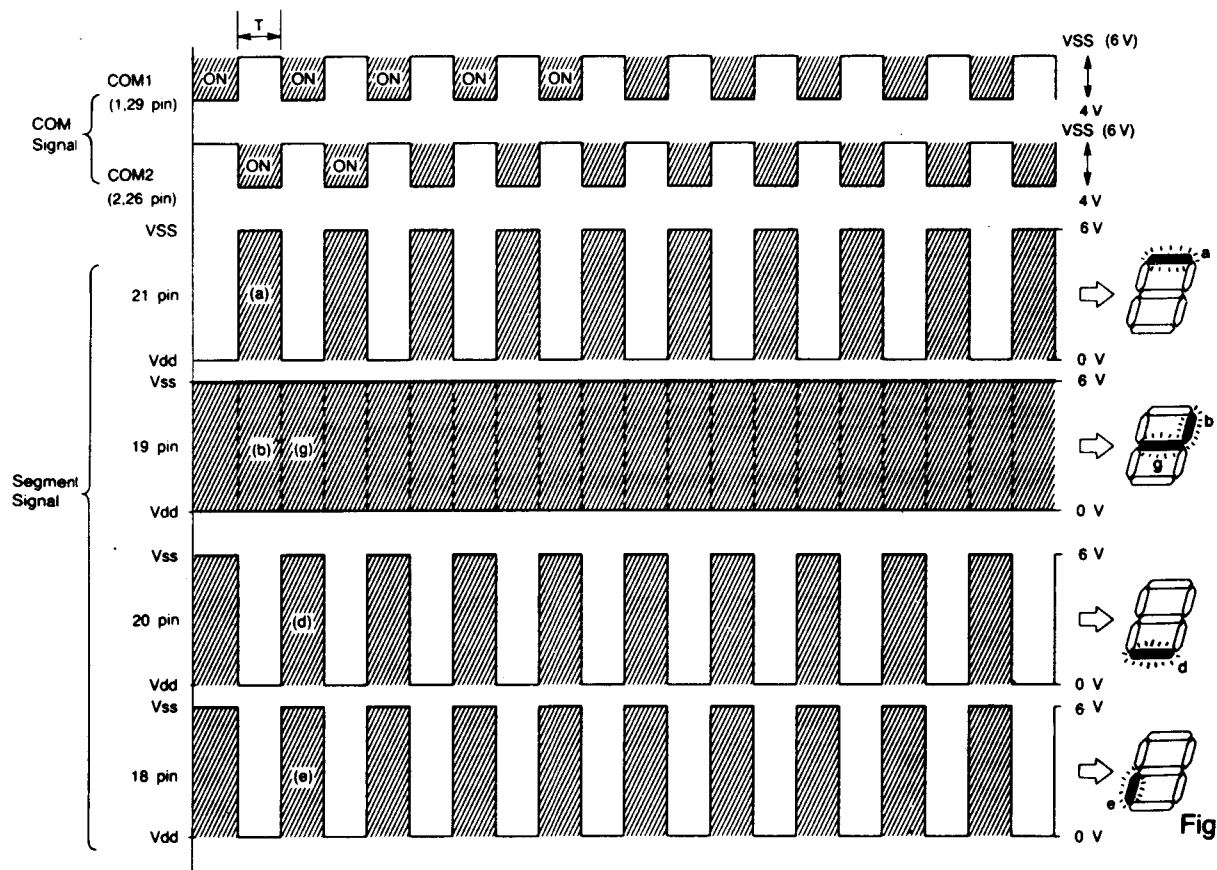



Fig. 5

UPD7507CU209 (IC3): EACH TERMINAL FUNCTION

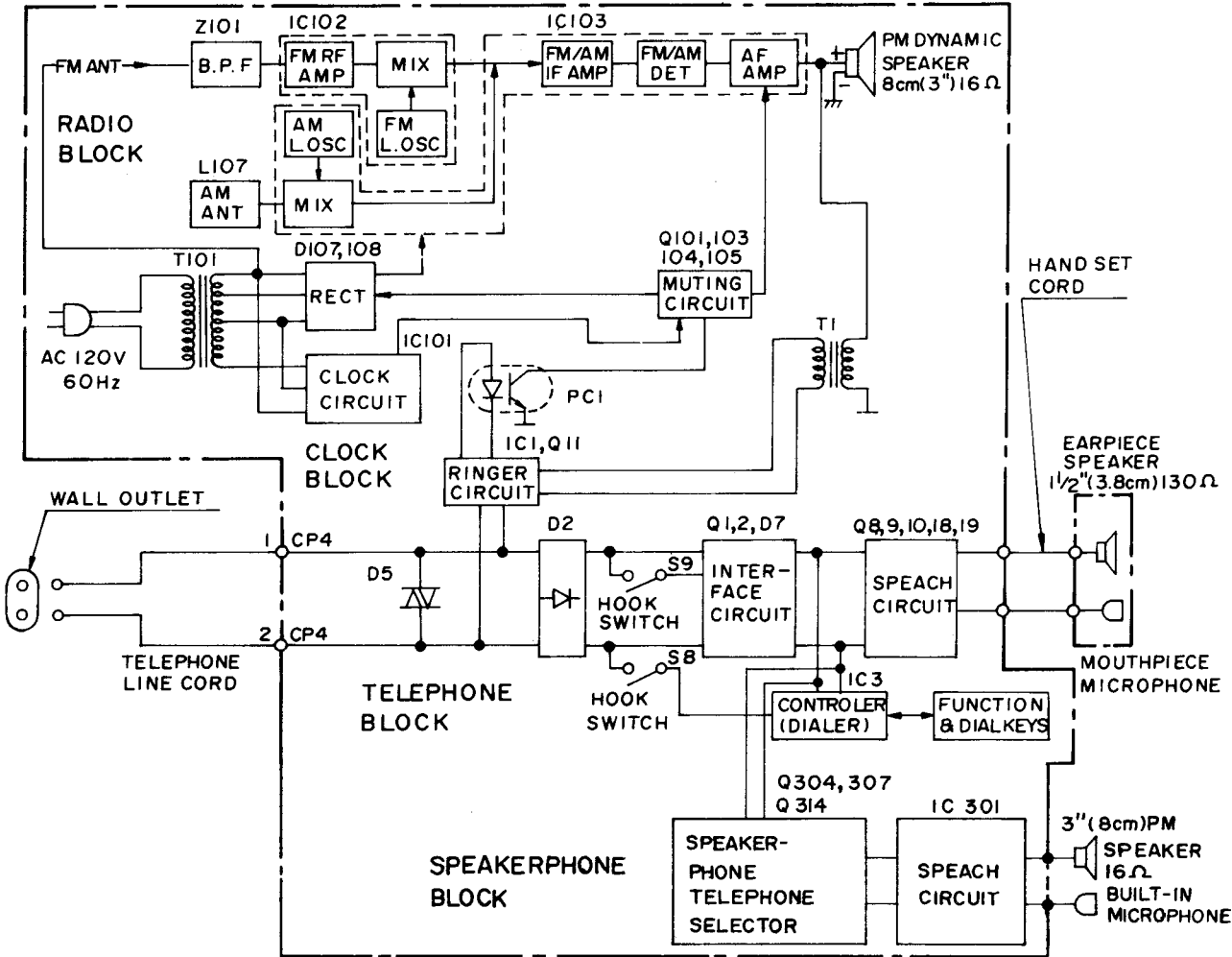
Pin. No.	Pin name	Operation and function
1	NC	No connect.
2	R/W	External memory read/write control terminal.
3	DTMF High	DTMF High frequency output terminal.
4, 5	A8, A9	External memory address output terminal.
6~9	D1, D2, D3, D4	External memory data input/output terminal.
10~13	key out, A4 key out, A5 key out, A6 key out, A7	Key scan signal output & external memory address output terminal. Connected to key input terminals 14 to 17 through the key matrix.
14~17	key in, A0 key in, A1 key in, A2 key in, A3	Key return signal input & external memory address output terminals. Connected to key output terminals 10 to 13 through the key matrix.
18	RESET	Reset signal Input terminal.
19	CL1	External clock input terminal.
20	V _{DO}	+B power supply input pin.
21, 22	NC	No connect.
23	ON/OFF	Speaker phone ON/OFF switch input terminal.
24	key tone	Key tone output terminal (1 kHz).
25	SET/PROGRAM	RINGER, PROGRAM control input terminal, high input during normal use.
26	OFF-HOOK	HOOK control input terminal, low is input during off-hook mode.
27	TONE/PULSE	Dial mode control input terminal, tone mode at high input and pulse mode at low input.
28, 29	PD	Backup battery voltage check terminal Low is input when the battery voltage falls below the effective voltage.
30	FLASH	Flash control input terminal, low is input during flash mode.
31	DIAL PULSE	Dial pulse output terminal, high is output during break mode.
32	SPEAKER	Speaker control output terminal, low is output when the speaker is being used.
33	Reset Control	No connect.
34	Multi Indicator	Multi Indicator output terminal.
35	CE	External memory control output terminal.
36	DTMF LOW	DTMF LOW Frequency output terminal.
37	T-MUTE	Transmitter mute control output terminal, low is output during muting.
38	R-MUTE	Receive mute control output terminal, low is output during muting.
39	V _{SS}	GND Terminal
40	X1	External clock input terminal, inputs the same signal as terminal 19.

D.T.M.F.: Dual Tone Multi Frequency

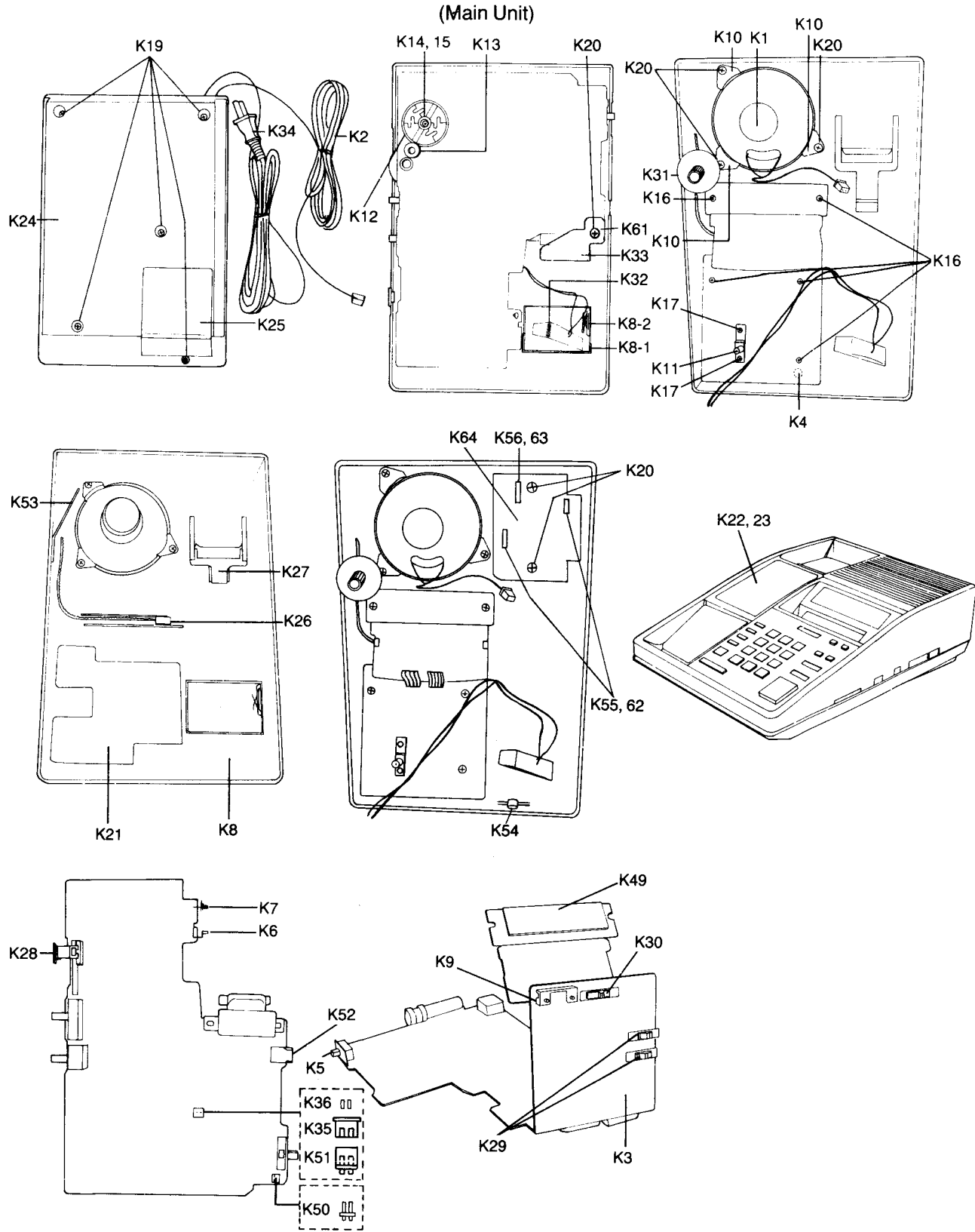
RVILM8560B (IC101): EACH TERMINAL FUNCTION

Pin No.	Terminal	Description
1 ~ 13	LED segment signal	Output terminals for LED segment drive signals.
14	COLON OUTPUT	No connect.
15	VSS (power input)	+B Power supply input pin.
16	ALARM OUTPUT	Terminal for modulation signal output for alarm. 
17	SLEEP OUTPUT	When sleep timer operates, sleep signal ("H" level) is outputted.
18	ALARM OFF	When this terminal is at "H" level, alarm signal is not outputted.
19	ALARM DISPLAY	No connect.
20	VDD (Ground)	Ground terminal.
21	Minute Set	Minute time is counted as long as this terminal is at Hi level.
22	Hour Set	Hour time is counted as long as this terminal is at Hi level.
23	SLEEP INPUT	The sleep timer is set when this terminal is at Hi level, and at the same time, Hi level signal is outputted from SLEEP OUT terminal.
24	DOZE INPUT	When this terminal is set to Hi level, the alarm signal will stop.
25	50/60 Hz INPUT	Terminal to input a power supply frequency (50/60 Hz).
26	50/60 Hz SELECT INPUT	Terminal to select power supply frequency (50/60 Hz). connected with Vss: 50 Hz connected with Vdd: 60 Hz
27	CR INPUT	Normally, a built-in back-up oscillator controls the time counter instead of 50/60 Hz input signal when time base input signal is stopped in the event of power failure (back-up function). This terminal is used to produce alarm output signal. Oscillation frequency is varied by the externally-connected CR.
28	12/24HR SELECTOR	Terminal to input 12/24-hour display selection. connected with Vdd: 12-hour connected with Vss: 24-hour

BLOCK DIAGRAM



CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part. No.	Part Name & Description	Ref. No.	Part. No.	Part Name & Description	Ref. No.	Part. No.	Part Name & Description
CABINET PARTS						ACCESSORIES		
K1	RAS8P23Z	Speaker	K31	RBT245Z	Knob, Tuning	A1	RQX4678Z	Instruction Book
K2	RJP0R3Z	Telephone Line Cord	K32	RJB5001Y	Battery Snap	A2	RJP0R2Z	Handset Cord
K3	RUP1978Z	Printed Circuit Board	K33	RUP1984Z	Printed Circuit Board	A3	UM-4NEP	Battery
K5	RUV731Z	Cover	K34	RJA98Z	Power Cord, AC Δ			
K6	RJC40006Y	Battery Terminal	K35	RJS2L3Z	Socket (2P)			
K7	RJC80005Y	Battery Spring	K36	RJT707Z	Terminal			
K8	RYMCT370M1	Upper Cabinet Ass'y	K37	RWR2604A36	Ear Speaker	P1	RPN4796Z	Pad, Top
K8-1	RJC94001Z	Battery Spring	K39	RWR4015A36	Modular Jack	P2	RPN4797Z	Pad, Accessory
K8-2	RJC996Z	Battery Spring	K40	XTN23+12C	Screw, Clamper M'tg	P3	RPH488Z	Polyethylene Cover, Main Unit
K9	RMP246Z	Clock, Bracket	K41	RWR6527A36	Mic Housing	P5	RPN4783Z	Pad, Bottom
						P6	RPK2126Z	Gift Box
K10	RMS12B	Speaker Bracket	K42	XTS3+12B	Screw, Speaker Housing M'tg			
K11	RME382Z	Spacer	K43	RWR6542A36	Cover, Hand Set M'tg Screw			
K12	RDG5826Z	Dial Drum	K44	XWG23X6	Washer, Clamper M'tg			
K13	RDG5827Z	Gear	K45	RWR6528A36	Clamper			
K14	XSN26+4	Screw, Dial Drum M'tg	K46	RWR4804A36	Printed Circuit Board			
K15	XWA26B	Washer, Dial Drum M'tg	K47	RWR8004A36	Top Housing			
K16	XTN2+6B	Circuit Board M'tg Screw, Clock Key	K48	RWR80219A36	Bottom Housing			
			K49	RADTLG2268	Liquid Crystal Display			
K17	XTN2+8B	Circuit Board M'tg Screw, Boss M'tg	K50	RJP2G1Z	Plug (2P)			
			K51	RJP2G4Y	Plug (2P)			
K19	XTV3+12G	Board M'tg Screw, Cabinet, Main Circuit	K52	RJS0R12Z	Modular Jack, Main Unit			
K20	XTV3+8G	Board M'tg Screw, Speaker M'tg	K53	RUV746Z	Cover, Dial Pointer			
			K54	RJM153Z	Built-in Microphone			
K21	RHG5031Y	Rubber Switch	K55	RJS3L3Z	Socket (3P)			
K22	RHP2024Z	Sheet	K56	RJS6L3Z	Socket (6P)			
K23	RHR2088Z	Sheet Cover	K57	RHG5034Z	Rubber Cushion			
K24	RYFCT370M1	Rear Cabinet Ass'y	K59	RWR6437A36	Spacer			
K25	RKK300Y1	Battery Cover	K61	RHR343Z	Bracket			
K26	RDP297Z	Pointer, Dial	K62	RJP3G4Y	Plug (3P)			
K27	RBC767Z	Button, Hook	K63	RJP6G4Y	Plug (6P)			
K28	RBD345Z	Knob, Volume	K64	RUP1992Z	Printed Circuit Board			
K29	RBD346Z	Knob, Alarm, Radio						
K30	RBD347Z	Knob, Pulse/Tone						

